

CLAIMS

1. A method of measuring an object with a coordinate positioning apparatus, comprising the following steps,
5 in any suitable order:

 placing the object within the working volume of
 the coordinate positioning apparatus;

 measuring the object with a workpiece contacting
 probe to create measurement data of the object, the
10 measurement data being collected at multiple probe
 forces;

 for at least one location on the surface of the
 object, determining a function or look up table
 relating the measurement error data to the probe force;

15 for said at least one location on the surface of
 the object, using the function or look up table to
 determine the measurement data corresponding to zero
 probe force;

20 and outputting the measurement data corresponding
 to zero probe force as the measurement of the object.

2. A method according to claim 1 wherein the
 measurement data corresponding to zero measurement
 force is determined by extrapolation.

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3. A method according to any of claims 1 or 2 wherein
 the measurement data is collected at known constant
 probe forces.

30 4. A method according to any of claims 1 or 2 wherein
 the measurement data is collected at known varying
 probe force.

5. A method according to any preceding claim wherein

the step of measuring the object with a workpiece contacting probe comprises scanning the object.

6. A method according to any preceding claim wherein
5 the function is a linear function.

7. A method according to any of claims 1-5 wherein
the function is a parametric function.

10 8. A method according to any preceding claim,
wherein:

the object is measured along a scan path and
measurement data is collected at multiple probe forces
for a section of the scan path;

15 the function or look up table relating the
measurement data to the probe force is determined for
locations on said section of the scan path;

and wherein for locations on the scan path but not
on said section of the scan path, the function or look
20 up table relating the measurement data to the probe
force is determined from measurement data collected on
said section of the scan path.

9. A method according to claim 8 wherein the function
25 or look up table relating the measurement data to the
probe force for locations on the scan path but not on
said section of the scan path is determined from
component parts of the function or look up table
relating the measurement data to the probe force on
30 said section of the scan path.

10. A method according to any of claims 8 or 9 wherein
the object may be measured along the scan path by
scanning a surface profile for one revolution at a

constant or variable probe deflection or probe force.

11. A method according to any of claims 8-10 wherein measurement data is collected at multiple probe forces
5 for a section of the scan path by taking additional measurements on the scan path at a different probe force.

12. A method according to claim 11 wherein the
10 additional measurements are taken by scanning the surface profile for at least a quarter revolution.

13. A method according to claim 11 wherein the measurements are taken by taking measurements of the
15 surface profile as the probe is moved radially towards or away from the surface at at least two different locations.

14. A method of measuring an object with a coordinate positioning apparatus, comprising the following steps,
20 in any suitable order:

placing the object within the working volume of the coordinate positioning apparatus;

25 measuring the object with a workpiece contacting probe to create measurement data of the object, the measurement data being collected at multiple stylus deflections;

for at least one location on the surface of the object, determining a function or look up table
30 relating the measurement error data to the stylus deflection;

for said at least one location on the surface of the object, using the function or look up table to determine the measurement data corresponding to zero

stylus deflection;

and outputting the measurement data corresponding to zero stylus deflection as the measurement of the object.

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15. A method according to claim 14 wherein the measurement data corresponding to zero stylus deflection is determined by extrapolation.

10 16. A method according to any of claims 14 or 15 wherein the measurement data is collected at known constant stylus deflections.

15 17. A method according to any of claims 14 or 15 wherein the measurement data is collected at known varying stylus deflection.

18. A method according to any of claims 14-17 wherein the step of measuring the object with a workpiece
20 contacting probe comprises scanning the object.

19. A method according to any of claims 14-18 wherein the function is a linear function.

25 20. A method according to any of claims 14-18 wherein the function is a parametric function.

21. A method according to any of claims 14-20, wherein:

30 the object is measured along a scan path and measurement data is collected at multiple stylus deflections for a section of the scan path;

the function or look up table relating the measurement data to the stylus deflection is determined

for locations on said section of the scan path;
and wherein for locations on the scan path but not
on said section of the scan path, the function or look
up table relating the measurement data to the stylus
5 deflection is determined from measurement data
collected on said section of the scan path.

22. A method according to claim 21 wherein the
function or look up table relating the measurement data
10 to the stylus deflection for locations on the scan path
but not on said section of the scan path is determined
from component parts of the function or look up table
relating the measurement data to the stylus deflection
on said section of the scan path.

15 23. A method according to any of claims 21 or 22
wherein the object may be measured along the scan path
by scanning a surface profile for one revolution at a
constant or variable stylus deflection.

20 24. A method according to any of claims 21-23 wherein
measurement data is collected at multiple stylus
deflections for a section of the scan path by taking
additional measurements on the scan path at a different
25 stylus deflection.

25. A method according to claim 24 wherein the
additional measurements are taken by scanning the
surface profile for at least a quarter revolution.

30 26. A method according to claim 24 wherein the
measurements are taken by taking measurements of the
surface profile as the probe is moved radially towards
or away from the surface at at least two different

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locations.